

Claims

1. An illumination system, comprising:
a first light source and a second light source, each of which are for
providing light having a wavelength ≤ 193 nm; and
an optical element,
wherein said first light source illuminates a first area of said optical
element and said second light source illuminates a second area
of said optical element.
2. The illumination system of claim 1, wherein said optical element
has a plurality of raster elements for partitioning light from said first and
said second light source into a plurality of light channels.
3. The illumination system of claim 2, wherein said first area and said
second area are spatially separated from one another.
4. The illumination system of claim 2, wherein said first area includes
a first subset of said plurality of raster elements, and said second area
includes a second subset of said plurality of raster elements.
5. The illumination system of claim 2, wherein said first light source
comprises a first collecting optical element.
6. The illumination system of claim 5, wherein said second light
source comprises a second collecting optical element.
7. The illumination system of claim 5, wherein said plurality of raster
elements includes a first subset of said plurality of raster elements in said
first area, in an arrangement adapted to said first collecting optical
element.

8. The illumination system of claim 7,
wherein said second light source includes a second collecting optical
element, and
wherein said plurality of raster elements includes a second subset of
said plurality of raster elements in said second area, in an
arrangement adapted to said second collecting optical element.
9. The illumination system of claim 2, wherein said optical element is
a first optical element, and said plurality of raster elements is a
first plurality of raster elements, and
wherein said illumination system further comprises a second optical
element with a second plurality of raster elements for receiving
said plurality of light channels from said first plurality of raster
elements.
10. The illumination system of claim 9,
wherein said first area includes a first subset of said first plurality of
raster elements for partitioning light from said first light source
into a plurality of light channels,
wherein said second plurality of raster elements receives said
plurality of light channels such that a member of said first
plurality raster elements and a member of said second plurality
of raster elements are each assigned to a member of said
plurality of light channels, and
wherein said plurality of light channels is configured to provide an
illumination pattern in an exit pupil of said illumination system.
11. The illumination system of claim 10, wherein said illumination
pattern is in a shape selected from the group consisting of a circular shape
and an annular shape.
12. The illumination system of claim 10,

wherein said plurality of light channels is a first plurality of light channels, and said illumination pattern is a first illumination pattern,

wherein said second area includes a second subset of said first plurality of raster elements for partitioning light from said second light source into a second plurality of light channels,

wherein said second plurality of raster elements receives said first plurality of light channels in a first subset of said second plurality of raster elements, and receives said second plurality of light channels in a second subset of said second plurality of raster elements, such that a member of said second subset of said first plurality of raster elements and a member of said second subset of said second plurality of raster elements are each assigned to a member of said second plurality of light channels, and

wherein said second plurality of light channels is configured to provide a second illumination pattern in said exit pupil.

13. The illumination system of claim 12, wherein said second illumination pattern is in a shape selected from the group consisting of a circular shape and an annular shape.

14. The illumination system of claim 12, wherein said first illumination pattern has a shape that is different from that of said second illumination pattern.

15. The illumination system of claim 2, wherein said first light source comprises a spectral filter.

16. The illumination system of claim 15, wherein said second light source comprises a spectral filter.

17. The illumination system of claim 2, wherein said first light source comprises a reflecting optical element.

18. The illumination system of claim 17, wherein said second light source comprises a reflecting optical element.

19. The illumination system of claim 2,
wherein said first light source includes a first collector for collecting
first light from a light emitter and focusing said first light to a first
focus point,
wherein said second light source includes a second collector for
collecting second light from a light emitter and focusing said
second light to a second focus point, and
wherein said first focus point is at a position that is substantially
identical to that of said second focus point.

20. The illumination system of claim 19, wherein said first area and
said second area are spatially separated from one another.

21. The illumination system of claim 19, wherein said first area
comprises a first plurality of first raster elements and said second area
comprises a second plurality of first raster elements.

22. The illumination system of claim 19, wherein said plurality of
raster elements includes a first subset of said plurality of raster elements
in said first area, in an arrangement adapted to said first collecting optical
element.

23. The illumination system of claim 22, wherein said plurality of
raster elements includes a second subset of said plurality of raster
elements in said second area, in an arrangement adapted to said second
collecting optical element.

24. The illumination system of claim 19,
wherein said optical element is a first optical element, and said
plurality of raster elements is a first plurality of raster elements,
and
wherein said illumination system further comprises a second optical
element with a second plurality of raster elements for receiving
said plurality of light channels from said first plurality of raster
elements.

25. The illumination system of claim 24,
wherein said first area includes a first subset of said first plurality of
raster elements for partitioning light from said first light source
into a plurality of light channels,
wherein said second plurality of raster elements receives said
plurality of light channels, such that a member of said first
plurality raster elements and a member of said second plurality
of raster elements are each assigned to a member of said
plurality of light channels, and
wherein said plurality of light channels is configured to provide an
illumination pattern in an exit pupil of said illumination system.

26. The illumination system of claim 25, wherein said illumination
pattern is in a shape selected from the group consisting of a circular shape
and an annular shape.

27. The illumination system of claim 25,
wherein said plurality of light channels is a first plurality of light
channels, and said illumination pattern is a first illumination
pattern,

wherein said second area includes a second subset of said first plurality of raster elements for partitioning light from said second light source into a second plurality of light channels, wherein said second plurality of raster elements receives said first plurality of light channels in a first subset of said second plurality of raster elements, and receives said second plurality of light channels in a second subset of said second plurality of raster elements, such that a member of said second subset of said first plurality of raster elements and a member of said second subset of said second plurality of raster elements are each assigned to a member of said second plurality of light channels, and wherein said second plurality of light channels is configured to provide a second illumination pattern in said exit pupil.

28. The illumination system of claim 27, wherein said second illumination pattern is in a shape selected from the group consisting of a circular shape and an annular shape.

29. The illumination system of claim 27, wherein said first illumination pattern has a shape that is different from that of said second illumination pattern.

30. The illumination system of claim 19, wherein said first collecting optical element has a shape selected from the group consisting of a cylindrical shape and an elliptic shape.

31. The illumination system of claim 30, wherein said second collecting optical element has a shape selected from the group consisting of a cylindrical shape and an elliptic shape.

32. An projection exposure apparatus, comprising:

a plane for accommodating a mask;
the illumination system of claim 2, for illuminating said plane;
a carrier system for accommodating a light-sensitive object; and
a projection objective lens for imaging said mask on said light-sensitive object.

33. A light source device comprising:
a first light source for emitting a first light bundle having a wavelength ≤ 193 nm;
a second light source for emitting a second light bundle having a wavelength ≤ 193 nm; and
an optical unit having a first plurality of raster elements for redirecting each of said first and second light bundles to produce a combined light bundle.

34. The light source device of claim 33, further comprising an optical element having a second plurality of raster elements for focusing one of said first and second light bundles onto said optical unit.

35. The light source device of claim 34,
wherein said combined light bundle is directed to an optical device for illuminating a field in an image plane,
wherein said optical device includes a third plurality raster elements,
and
wherein said first, second and third plurality of raster elements each contain the same number of raster elements.

36. A projection exposure apparatus, comprising:
a plane for accommodating a mask;
an illumination system for illuminating said plane with light having a wavelength ≤ 193 nm, wherein said illumination system has a plurality of light sources;

a carrier system for accommodating a light-sensitive object; and
a projection objective lens for imaging said mask on said light
sensitive object.

37. The projection exposure apparatus of claim 36,
wherein said plurality of light sources includes a first light source and
a second light source, and
wherein said first light source is operated under a first operating
condition and said second light source is operated under a
second operating condition, and wherein said first operating
condition is different from said second operating condition.

38. The projection exposure apparatus of claim 36,
wherein said plurality of light sources comprises a first light source
for emitting a first light beam and a second light source for
emitting a second light beam, and
wherein said first and said second light beams are incoherently
superimposed to reduce a degree of coherence of said
illumination system.

39. A method for production of microelectronic components,
comprising using the projection exposure apparatus of claim 36.

40. A projection exposure apparatus, comprising:
a plurality of light sources for providing light having a wavelength \leq
193 nm; and
an optical element for collecting and condensing said light to
illuminate a reticle in an area to expose a pattern on a
substrate.

41. A projection exposure apparatus, comprising:

a first light source for emitting light having a first wavelength ≤ 193 nm; and
a second light source emitting light having a second wavelength ≤ 193 nm,
wherein said first wavelength is different from said second wavelength.